

11. (Amended) The film formation apparatus according to Claim 6; further comprising:

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cont
a magnet disposed adjacent to a surface of the cathode opposite a surface on which plasma is generated, for controlling a motion of an arc point of the vacuum arc discharge.

REMARKS

Claims 1-11 are pending in the application, of which claims 1, 5 and 6 are independent. In the Official Action of October 8, 2002, the Examiner rejected claims 1-11. The Examiner rejected claims 1 and 2 under 35 U.S.C. § 102(b) and claims 4 and 5 under 35 U.S.C. § 103(a) as being unpatentable over U.S. Patent No. 5,317,235 ("*Treglio*"). The Examiner rejected claims 3 and 6-9 under 35 U.S.C. § 103(a) as being unpatentable over U.S. Patent No. 5,317,235 ("*Treglio*") in view of U.S. Patent No. 5,480,527 ("*Welty*"). The Examiner rejected claim 10 under 35 U.S.C. § 103(a) as being unpatentable over U.S. Patent No. 5,317,235 ("*Treglio*") in view of EP Patent No. EP 0725424 A1 ("*Murakami, et al.*"). The Examiner rejected claim 11 under 35 U.S.C. § 103(a) as being unpatentable over U.S. Patent No. 5,317,235 ("*Treglio*") in view of U.S. Patent No. 5,480,527 ("*Welty*") and further in view of EP Patent No. EP 0725424 A1 ("*Murakami, et al.*"). The Applicant has amended claims 1, 2, 5, 6, 8, 10, and 11 and respectfully traverses this rejection.

Claim 1 patentably distinguishes the present invention from *Treglio* in that it recites, for example, a vacuum arc evaporation source, comprising a plurality of cathodes, each made of different materials; and a plurality of insulating layers for insulating the plurality of cathodes from each other; the plurality of cathodes and the

plurality of insulating layers arranged in alternating layers; wherein said plurality of cathodes are evaporated by vacuum arc discharge.

Claim 5 patentably distinguishes the present invention from *Treglio* in that it recites, for example, a film formation apparatus for forming a laminate film including a plurality of heterogeneous films on a surface of a substrate, the apparatus comprising a vacuum arc evaporation source having a plurality of cathodes, each made of different materials; and a plurality of insulating layers for insulating the plurality of cathodes from each other; the plurality of cathodes and the plurality of insulating layers arranged in alternating layers; wherein said plurality of cathodes are evaporated by vacuum arc discharge; an arc power supply for supplying arc discharge power to said plurality of cathodes of said vacuum arc evaporation source; and a switch for switching the arc discharge power of said arc power supply among the plurality of cathodes of said vacuum arc evaporation source.

Claim 6 patentably distinguishes the present invention from *Treglio* in view of *Welty* in that it recites, for example, a film formation apparatus for forming a laminate film including a plurality of heterogeneous films on a surface of a substrate, the apparatus comprising a vacuum arc evaporation source having a plurality of cathodes, each made of different materials; and a plurality of insulating layers for insulating the plurality of cathodes from each other; the plurality of cathodes and the plurality of insulating layers arranged in alternating layers; wherein said plurality of cathodes are evaporated by vacuum arc discharge; and a magnetic filter for generating a magnetic field to curve plasma containing material from said vacuum arc evaporation source so

as to remove coarse particles from the plasma and introduce the plasma into vicinity of the substrate.

In contrast to claims 1, 5 and 6, *Treglio* discloses a cathode arc source with a single cathode 24 made of a cathode material. The cathode is surrounded by a conductive anode 26. (*Treglio*, col. 3, lines 28-40). In an alternate embodiment disclosed in *Treglio*, a plurality of rod shaped cathodes are arranged in a circular pattern on a base plate. (*Treglio*, col. 4, lines 34-48). These cathodes are separated from each other. (*Treglio*, Figs. 4 and 5, col. 4, lines 34-48). *Treglio* does not disclose a plurality of cathodes, each made of different materials; and a plurality of insulating layers for insulating the plurality of cathodes from each other; the plurality of cathodes and the plurality of insulating layers arranged in alternating layers. Instead, *Treglio* discloses separately formed individual cathodes.

Welty fails to cure the defects of *Treglio*. *Welty* discloses a single rectangular shaped cathode mounted in an angled duct. (*Welty*, col. 5, lines 24-28). This single cathode is made of a single material - carbon. (*Welty*, Fig. 2, col. 9, lines 10-25). It is the rectangular shape of the cathode and plasma duct, and not the composition of the cathode itself that is disclosed in *Welty*. (*Welty*, Fig. 2, col. 9, lines 10-30). *Welty* does not disclose a plurality of cathodes, each made of different materials; and a plurality of insulating layers for insulating the plurality of cathodes from each other; the plurality of cathodes and the plurality of insulating layers arranged in alternating layers.

Murakami, et al. suffers from similar defects. *Murakami, et al.* discloses a single cathode 12 mounted on a flange. (*Murakami, et al.*, col. 4, lines 49-52). This cathode is made of a single metal, such a titanium. (*Murakami, et al.*, col. 4, lines 33-35). The

periphery of the cathode is covered with a ring-shaped shield plate used to spread the arc. (*Murakami, et al.*, col. 5, lines 19-27). *Murakami, et al.* does not disclose a plurality of cathodes, each made of different materials; and a plurality of insulating layers for insulating the plurality of cathodes from each other; the plurality of cathodes and the plurality of insulating layers arranged in alternating layers.

Claims 2-4 and 7-11 are allowable, at least for the reasons above regarding claims 1, 5, and 6 and by virtue of their dependency upon those claims. Accordingly, the Applicant respectfully requests withdrawal of the rejection of claims 2-4 and 7-11.


In view of the foregoing, the Applicant respectfully submits that the pending claims are patentable over the cited references. The preceding arguments are based only on the arguments in the Official Action, and therefore do not address patentable aspects of the invention that were not addressed by the Examiner in the Official Action. The claims may include other elements that are not shown, taught, or suggested by the cited art. Accordingly, the preceding argument in favor of patentability is advanced without prejudice to other bases of patentability.

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Respectfully submitted,

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APPENDIX TO AMENDMENT OF DECEMBER 17, 2002

VERSION WITH MARKINGS TO SHOW CHANGES MADE

AMENDMENTS TO THE CLAIMS

1. (Amended) A vacuum arc evaporation source, comprising:
a plurality of cathodes [including different kinds of materials from one another
and being insulated electrically from one another], each made of different materials; and
a plurality of insulating layers for insulating the plurality of cathodes from each
other;
the plurality of cathodes and the plurality of insulating layers arranged in
alternating layers;
wherein said plurality of cathodes are evaporated by vacuum arc discharge [to
thereby generate plasma having cathode materials].
2. (Amended) The vacuum arc evaporation source [according to] of Claim 1,
wherein said plurality of cathodes are disposed in coaxially alternating layers with [one
another through an] insulating material.

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5. (Amended) A film formation apparatus for forming a laminate film including a plurality of heterogeneous films on a surface of a substrate, the apparatus comprising:

a vacuum arc evaporation source having a plurality of cathodes [including different kinds of materials from one another and being insulated electrically from one another], each made of different materials; and a plurality of insulating layers for insulating the plurality of cathodes from each other; the plurality of cathodes and the plurality of insulating layers arranged in alternating layers; wherein said plurality of cathodes are evaporated by vacuum arc discharge [to thereby generate plasma having cathode materials];

an arc power supply for supplying arc discharge power to said plurality of cathodes of said vacuum arc evaporation source; and

a switch for [alternatively changing over] switching the arc discharge power of said arc power supply [toward said] among the plurality of cathodes of said vacuum arc evaporation source.

6. (Amended) A film formation apparatus for forming a laminate film including a plurality of heterogeneous films on a surface of a substrate, the apparatus comprising:

a vacuum arc evaporation source having a plurality of cathodes [including different kinds of materials from one another and being insulated electrically from one another], each made of different materials; and a plurality of insulating layers for insulating the plurality of cathodes from each other; the plurality of cathodes and the

plurality of insulating layers arranged in alternating layers; wherein said plurality of cathodes are evaporated by vacuum arc discharge [to thereby generate plasma having cathode materials]; and

a magnetic filter for generating a magnetic field to curve plasma [generated by] containing material from said vacuum arc evaporation source so as to remove[s] coarse particles from the plasma and introduce the plasma [, the coarse particles of which is removed,] into vicinity of the substrate.

8. (Amended) The film formation apparatus according to Claim 6, further comprising:

an arc power supply for supplying arc discharge power to the plurality of cathodes of said vacuum arc evaporation source; and

a switch for [alternatively changing over] switching the arc discharge power of said arc power supply [toward said] among the plurality of cathodes of said vacuum arc evaporation source.

10. (Amended) The film formation apparatus according to Claim 5; further comprising:

a magnet disposed adjacent to [the other] a surface of the cathode opposite [to] [the] a surface on which [the] plasma is generated, for controlling a motion of an arc point of the vacuum arc discharge.

11. (Amended) The film formation apparatus according to Claim 6; further comprising:

a magnet disposed adjacent to [the other] a surface of the cathode opposite [to] [the] a surface on which [the] plasma is generated, for controlling a motion of an arc point of the vacuum arc discharge.

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